

INTERDEPENDENCY STUDY OF STOCK INDEX OF INDIA WITH REFERENCE TO NIFTY AND INDIAN CURRENCY EXCHANGE RATE

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ABSTRACT

Interdependency of stock index and currency exchange rate is a subject of extensive study for over a decade and attracted many academicians and researchers worldwide. This is very important for every economy after globalization. In Indian context the issue is also an important topic in the post liberalization era. With this backdrop, the current study attempts to explore the causal relationship between stock index return & forex market in India with special reference to NSE Nifty. By using average daily data from April 2014 to March 2018, we found that the Index return has a direct relation with currency return, the causality test shows that increase in currency exchange return doesn't lead by Nifty return and increase in Nifty return doesn't lead by currency exchange rate

KEYWORDS: Stock, Currency & Exchange Rate

Received: Jun 22, 2019; **Accepted:** Jul 12, 2019; **Published:** Aug 31, 2019; **Paper Id.:** IJAFMRDEC20193

INTRODUCTION

Both the forex and the stock market of a country are crucial for the improvement of the economy. In both developing and developed country its exchange rate is a key determinant of decision made by foreign individuals & institutional investors, exporters & importers, bankers, businesses, economic institutions, policymakers and tourists. A stock market is a key intermediate between investors or lenders who have surplus funds and borrowers or Industry who requires funds. Financial liberalization and globalization in Indian economy brought a lot of change in the economy, which resulted in integration of global with domestic. As a result, the foreign financial markets give new opportunities and at the same time significant risks of the financial system is exposed. The adoption of more flexibility in foreign exchange controls creates opportunity of international investment and portfolio diversification with increase in volatility & risk. Now, Indian Forex market is going to be an integral part of the world markets.

The volatility and its impact have proved by many researchers earlier with well diverse conclusion. It remains an interesting topic among financial analysts and academicians. Both Stock market and forex volatility are considered as key factor to evaluate risk and financial status of a country. In many research hypotheses it has been shown that stock return volatility and currency exchange return have causal relationship. Fall in local currency market increases the demand in foreign exchange, resulting in increased value of firm and stock price. Similarly increase in domestic currency makes less profit and deals with decrease of foreign demand. Benita and Lauterbach (2004) have conducted different studies related to stock market efficiency; as per the study it can be observed that the volatility of the currency exchange rate reflects on the country's economy. However, unpredictable conditions in the stock market has been shown in different empirical evidence. Kurihara (2008:p.378) Stock exchange price is affected by different factors like domestic product, exchange rates and interest rates. In many studies it has been proven that business

profitability and competitiveness is determined by exchange rate. As per Nieh (2006) increase in forex rate reflects negatively & positively on the stock market of the country, it has also been researched that change in value of firm's economy then foreign operation also changes. Thus, movement in foreign exchange rates have important implications for the economy's trade, fund flows and business cycle and it is crucial for understanding financial developments and change in trade and industry policy. Hence, it's necessary to make a study of the causality between forex rate and index volatility in India with reference to Nifty.

SIGNIFICANCE OF THE RESEARCH

Exploring the inter dependency between forex rate & stock market index would help the scholars, researchers and investors to increase their understanding about these markets and will help in decision making about the investment and associated risk. It may be very helpful to make better government policies.

LITERATURE REVIEW

S. Poornima, M. Ganeshwari (2016) studied the causality between forex rate & stock index in India. In their study it is concluded that there is a causality between two variables. In the study ADF test and Granger causality test were used to test the stationary to check causality.

D Prasanna, Susan, Aruna, Jikku (2016) examined the relationship between exchange rate & stock index price of India. It is opined that stock index price is not significantly related with currency exchange rate.

Waseem Aslam (2014) studies in Pakistan on the linkage between forex rate & stock market volatility by using variables Exchange rate (represented by US \$) and KSE 100 index. His outcome reveals that PKR-USD and KSE- 100 index are negatively correlated.

Divyang Patel, Nikita Kaglewala (2013) in their study concludes that foreign exchange rate has no impact on Indian stock indexes i. e. Nifty and SENSEX.

Gaurav (2010) tries to study the interrelationship between currency exchange rate and Nifty returns, it results that both currency exchange rate & Nifty returns were not normally distributed. It is also found that both the variables were stationary. Both the variables are also negatively correlated.

Mukherjee & Bhattacharya (2003) tries to investigate India's stock markets index with currency exchange rate. They opined that both exchange rates & stock index are not significantly related with each other.

Nath & Samanta (2003) in their study suggest that there is no causal relationship between the two variables. By extending their research to check what they brought together in post liberalization. It concluded that stock price & currency exchange rate are not significantly related.

Yamini Karmarkar & G Kawadia (2000) examines the interrelationship between stock market index & forex rate with reference to India. Five composite & sectorial indices are used in their study for a period of one year i. e. 2000. It is found that forex rate is highly correlated with that of stock markets index movement.

Chouy.Y.C (1996) analyzed the interdependency between Indian stock index price and its time varying in macroeconomic conditions by using GARCH model. It was found that macroeconomic factors are conditionally affected by varying time.

Research Objective

The main aim behind the study is

- To analyze the interdependency and linkage of Indian forex & stock market.
- To investigate the impact of changes of forex rate on stock index return in India.

DATA & METHODOLOGY

This study is focused towards investigating the dynamics between Indian forex rate movement & its stock index volatility. To analyze, historical time series data have been collected from NSE & RBI official website which consist of Nifty return & Rupees-US Dollar(\$) Exchange Rates. It comprises of time series, data of daily open, close, high & low of index price. The data have been used for analyses and covers 4 years starting from 1st April, 2014 to 31st March, 2018. Daily index returns and forex rates were matched by working days of both NSE & RBI. In every data four price i.e. High, Low, Open & Close price is taken. The average daily indices have been calculated by the formula i.e. Average daily indices = (open + high + low + close)/4. In most of the studies the researcher take close price. But practically sometimes the index may open at high price, then remain at high but close at low or vice versa. So, to be rational the study is necessary to get daily average indices. The adjusted return are the natural logarithm of average price of the current day (t) and previous day (t-1), Mathematically $R_t = \log(P_t/P_{t-1})$

Empirical Testing

Three interrelated steps have been followed in the entire estimation procedure of this study: normality of the time series is examined by using JB test, then stationary of the data is examined by using ADF unit root test and finally co-integration test has been conducted to check causality between these two-time series.

Jarque Bera Statistics to Check Normality of the Data

To check the normality of time series data Jarque-Bera (JB) test is used. The values of kurtosis & skewness from descriptive statistics has been taken. Data is called normally distributed when it has 0 (Zero) skewness & 3 (Three) kurtosis.

JarqueBera can be presented as:

$$JB = \frac{N}{6} S + \frac{N}{24} K \quad (1)$$

where S= skewness, K= kurtosis, and N is number of estimations.

The result of the JarqueBera show in Table-1 that both Nifty return and Exchange rate return are not normally distributed, which may open the doors to stationary issue of the series of returns which are under study.

Table 1: Jarque-Bera Statistic of Both Nifty Return & Foreign Exchange Rate

	Nifty Return	Foreign Exchange Return
No of Observation	981	981
Mean of the series	0.041325	0.008151
Median of the series	0.067417	0.001493
Maximum	3.610867	1.279150
Minimum	-4.498114	-0.838606
Std. Deviation	0.728810	0.241246

Table 1: Contd.,		
Skewness of the series	-0.319784	0.299999
Kurtosis of the series	5.961322	5.021873
Jarque-Bera	375.1703	181.8106
Probability	0.000000	0.000000
Sum	40.53973	7.996009
Sum Sq Dev.	520.5413	57.03555
Result	Not Normal	Not Normal

Table 2: Unit Root Test

Variables	ADF statistics	Critical Values	P. Value	Results
Stock Index return	-13.75674	1% level -3.967479 5% level -3.414425 10% level -3.129344	0.0000000	Reject H_0
Currency Exchange Rate	-13.40432	1% level -3.967479 5% level -3.414425 10% level -3.129344	0.0000000	Reject H_0

Stationary Test by Using Augmented Dickey–Fuller (ADF) Test

For checking stationary or non-stationary of a time series unit root test is generally used. When the mean & variance of a data remain constant over a time period, the time series is said to be stationary. Through ADF test, by unit root again stationary of stock index i.e. Nifty return and Foreign Exchange return can be confirmed.

ADF test is used to check if our data series are stationary or non-stationary.

H_0 = That the data has unit root and is non-stationary

H_1 = That the data has no unit root and the series is stationary.

Condition: If $p > 0.5$ H_0 is accepted

If $p < 0.5$ H_1 is accepted

From the analysis it has been observed that the p-value of both the series are less than 5% of level, so we reject the null hypothesis of both stock index return & currency exchange rate. It indicates that the series both stock index return and currency exchange return are stationary in nature.

Co-Integration Test

When the series are non-stationary in nature and they are linearly combined, then the series are known as cointegrated.

Maximum Eigen value and trace statistic value of the test indicate there exists two co-integration vectors at 5% level. It confirms that there exists two co-integrating equation. Co-integration test applied with motive of finding if it has a long-term linkage between Forex rate & Stock Index return. The trace statistic values in the models are bigger than critical value in the statistical significance level of 5% and there exists co-integration relationship. It is also observed that critical values are less than maximum eigen value, statistics values in the statistical significance level of 5% and there is co-integrating relationship. Consequently, both maximum eigen value of the test and trace value show that there is a long-term relationship between relevant variables, in other words there exists a long-term linkage between forex rate & stock Index return.

Table 3

Trace Statistic		Eigen value	Trace statistic	0.05 Critical value	Probability
	None	0.179566	358.0904	15.49471	0.0001
	At most 1	0.155469	164.9184	3.841466	0.0000
Maximum Eigen value	None	0.179566	193.1720	14.26460	0.0001
	At most 1	0.155469	164.9184	3.841466	0.0000

Table 4

H ₀	Observation	F Statistic Value	P. Value
Forex rate doesn't Granger cause Index return	977	5.11090	0.0004
Index return doesn't Granger causes Forex rate		2.47570	0.0428

Pair-Wise Causality Test

With the help of this test we try to examine if past values of a series have illustrative effect on another series. The result of this test is presented in Table-4 and it shows if there exist significant causality it can be seen that Exchange rate does not ganger and causes NIFTY to reject as its probability value is less than 0.05. NIFTY doesn't ganger cause forex rate is also rejected and its probability value of the series is also less than 0.05.

CONCLUSIONS

Our study is related to find interdependency between movement of Forex rates and stock market index in India. The main aim is to examine whether the foreign exchange controls, rising value of Rupees affects indices in India. ADF test result shows that the variables are stationary & are co-integrated. We found positive correlation among forex rate & stock index returns, in other words there exist long- term relationship between forex rate & stock index return. Granger causality result show that stock index return doesn't lead to increase in exchange rate & increase in forex rate doesn't lead to increase in stock index return.

Columbia International Publishing

Journal of Advanced Computing

(2016) Vol. 5 No. 1 pp. 1–11

doi:10.7726/jac.2016.1001

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REFERENCES

1. Alam, M, Uddin, G. S and Taufique, R. K. (2007). *The Relationships between Exchange Rates and Stock Prices: Empirical Investigation from Johannesburg Stock Exchange* [Online] . [http : // www. academia. Edu / 822774 / The _ Relationships _ between _Exchange_Rates_and_Stock_Prices_Empirical_Investigation_from_Johannesburg_Stock_Exchange](http://www.academia.edu/822774/The_Relationships_between_Exchange_Rates_and_Stock_Prices_Empirical_Investigation_from_Johannesburg_Stock_Exchange).
2. ArunaPolisetty, Dr. D.Prasanna Kumar & Mrs.Jikku Susan Kurian, "Influence of Exchange Rate on BSE Sensex & NSE Nifty", *IOSR Journal of Business and Management (IOSR-JBM)* e-ISSN: 2278-487X, p-ISSN: 2319-7668. Volume 18, Issue 9 Ver. II (Sep. 2016), PP 10-15
3. Apte, P. (2001). "The interrelationship between stock markets and the foreign exchange market". *Prajnan*, 30, 17-20. <http://dx.doi.org/10.2139/ssrn.2161245>
4. Bhattacharya, B. and J. Mukherjee (2003). "Causal Relationship between Stock Market and Exchange Rate. Foreign Exchange Reserves and Value of Trade Balance: A Case Study for India". *The 5th Annual Conference on Money and Finance in the Indian Economy on January 2003*.
5. Cherni, A. B. E. L. B. A. K. I. (2016). Modeling the nonlinear adjustment of the Dinar/Euro exchange rate: An application of the STAR model. *International Journal of Economics Commerce and Research*, 6(2), 13-26.
6. Deeptigulati & Monikakakhani (2012) "Relationship between Stock Market and Foreign Exchange Market in India: An Empirical Study", *Pacific Business Review International* 5(5).
7. Divyang Patel and Nikita Kagalwala (2013). *The Impact of Exchange Rate on Indian Stock Exchanges like BSE &NSE*, *International journal of scientific research*, 2(10), 1-2.
8. Gaurav Agrawal and Aniruddh Kumar Srivastav (2010), "A Study of Exchange Rates Movement and Stock Market Volatility", *International Journal of Business and Management*, Vol.5, pp.62-73.
9. Muhammad and Rasheed (2002). *Stock Prices and Exchange Rates: Are they Related? Evidence from South Asian Countries* *The Pakistan Development Review* 41:4 Part II (Winter 2002) pp. 535-550
10. Nath, G. C, Samanta, G. P. (2003), "Relationship Between Exchange Rate and Stock Prices in India – A Empirical Analysis", pp. 1-11.
11. KON, M, HSU, S. M, & KUNG, L. S. (2016). Why Did China Take the One Belt and One Road (OBOR) Strategy and Initiate the Asian Infrastructure Investment Bank (AIIB)?. *International Journal of Economics, Commerce and Research (IJECR)*, 6(2), 39-54.
12. Poornima, D. S, Ganeshwari, M. (2016), "Relationship between Exchange Rates and Stock Market Index: Evidence from the Indian Stock Market", *International Journal of Science and Research (IJSR)*, Vol. 5, Issue 10, pp. 16-18.
13. Rahman, M. L. and Uddin, J. (2009). "Dynamic Relationship between Stock Prices and Exchange Rates: Evidence from Three South – Asian Countries". *International Business Research*, 2, pp: 167-174. <http://dx.doi.org/10.5539/ibr.v2n2p167>

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Publications

Biswal, S. K, “Modern Travel Management & Challenges from Airlines”, Strategy – The Journal for Management Development, Vol. VI, No.1.

Biswal, S. K, “Management by Consciousness”, Management Perception, Vol. VI, No.1, 2004.

